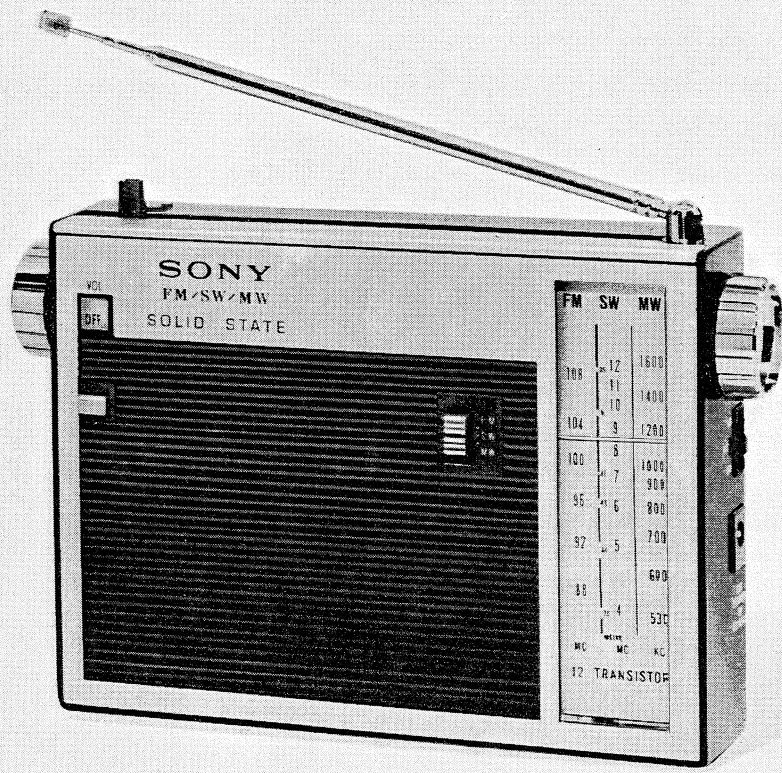
TFM-110WB



Specifications

Circuit :	12 Transistor Superheterodyne
Frequency Coverage :	FM 86.5～108 Mc (3.53～2.78 m)
	SW 3.9～12 Mc (77～25 m)
	MW 530～1,605 Kc (566～187 m)
Intermediate Frequency :	FM 10.7 Mc AM 455 Kc
Antenna System :	FM, SW Built-in Telescopic Antenna
	MW Built-in Ferrite Bar Antenna
Maximum Sensitivity :	FM 6.5 dB (2.2μV/m)
(at 10 mW output)	SW 17 dB (8μV/m)
	MW 25 dB (19μV/m)
Selectivity :	MW 28 dB at 10 Kc off resonance, at 1,400 Kc
Output Power :	300 mW (undistorted)
	500 mW (maximum)
Current Drain :	17 mA (AM), 22 mA (FM) at zero signal, 160 mA at 300 mW output
Speaker :	Oval type, 10×6.5 cm (4×2-1/2") PM dynamic, 8Ω
Power Source :	3 "C" Size Flashlight Batteries (4.5 V in total), or House Current by using SONY AC Power Adaptor
Dimensions :	180 (W) × 131 (H) × 47.5 mm (D) (7-1/8×5-3/16×1-7/8")
Weight :	0.95 Kg (2 lbs. 2 ozs.) with Battery

SONY®

SERVICING GUIDE

Removal of Chassis

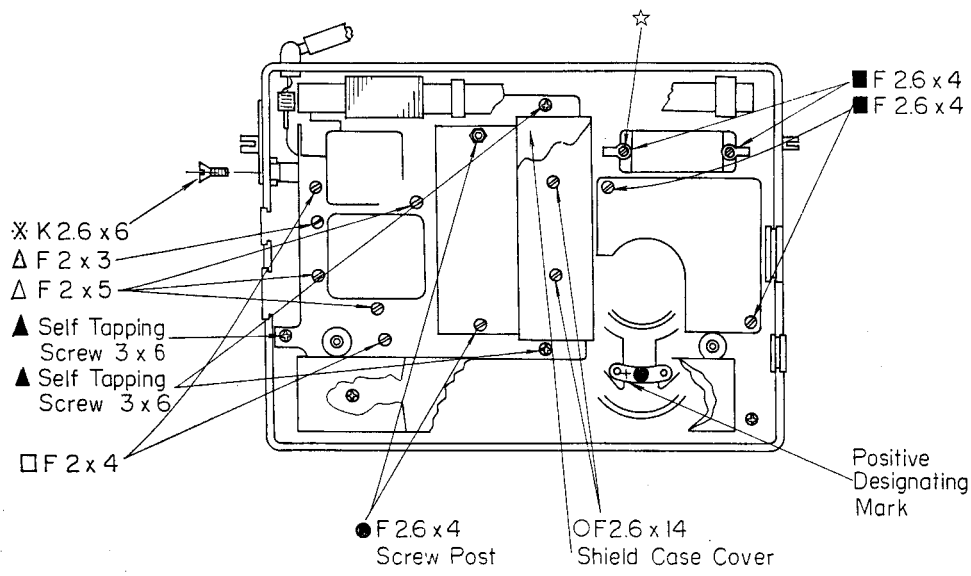
(1) Remove the three Back Cover Holding Screws (⊕RK 2.6×4) to remove the Back Cover.
(2) Take out all the Batteries.
(3) Remove a Battery Cylinder Holding Screw.
(4) Unsolder the FM Loading Coil at the Telescopic Antenna Terminal.
(5) Unsolder a red lead at the Battery Positive Contact Plate.
(6) Remove the Volume Control Knob and the Tuning Knob by pulling them straight out.
(7) Pull out the two black tips from the Bar Antenna Holders.
(8) Remove the Ferrite Bar at the right side of the Bar Antenna Holders.
(9) Remove the three Screws marked with ▲ shown in Fig. 1.
(10) Remove a Screw (K 2.6×6) marked with ※ shown in Fig. 1.
(11) Remove the EXT POWER IN Jack and the AFC ON/OFF Switch from the Cabinet by pulling them straight out.
(12) Unsolder the Capacitor connected between the Chassis and the AF Circuit Board at the AF Circuit Board.
(13) Remove a Screw marked with ☆ shown in Fig. 1.
(14) Take out the Chassis from the Cabinet gently taking care not to cut the leads.

Removal of IF Circuit Board

(1) Remove the IF Shield Case Cover.
(2) Remove the two Screws marked with ○ shown in Fig. 1.
(3) Unsolder all the leads going from it to other points, and it can now be removed.

Removal of AF Circuit Board

(1) Remove the four Screws marked with ■ shown in Fig. 1.
(2) Remove the Twin Jack by pulling it out.
(3) Unsolder the following wires at the AF Circuit Board.
   a) A black lead coming from the Battery Negative Spring.
   b) A gray lead coming from the Dial Lamp.
   c) Two leads (a red and a black) coming from the IF Circuit Board.
   d) Four leads (a red, a black, a orange and a yellow) coming from the Volume Control.
(4) Remove the AF Circuit Board from the Cabinet gently taking care not to cut the leads.


☆
■ F 2.6 x 4
■ F 2.6 x 4
※ K 2.6 x 6
Δ F 2 x 3
Δ F 2 x 5
▲ Self Tapping Screw 3 x 6
▲ Self Tapping Screw 3 x 6
□ F 2 x 4
● F 2.6 x 4 Screw Post
○ F 2.6 x 14 Shield Case Cover
Positive Designating Mark

(Fig. 1)

Removal of AM Tuner Circuit Board

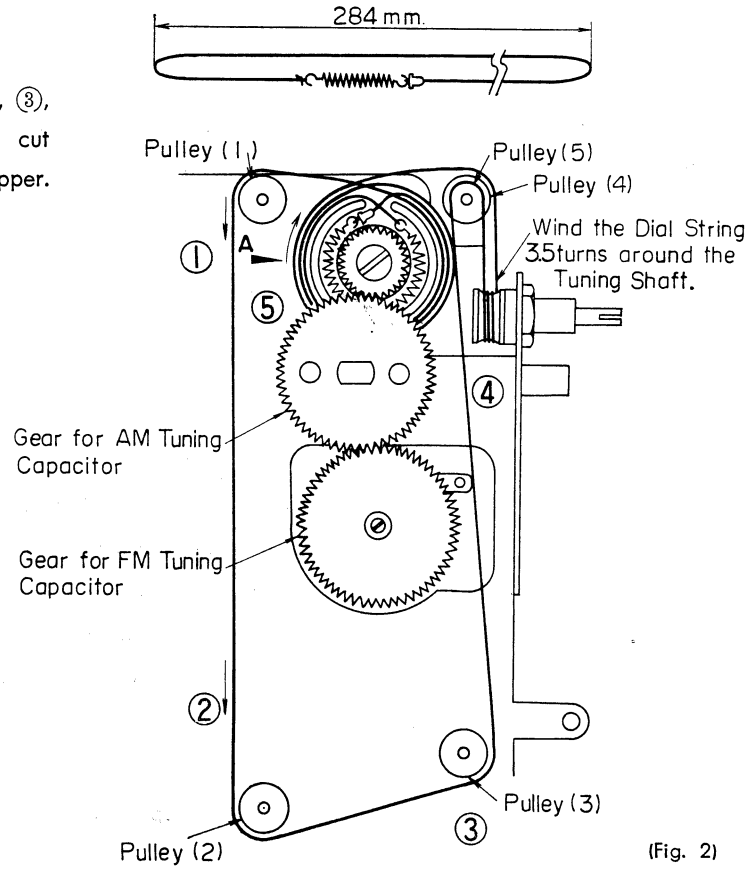
(1) Remove the Chassis as outlined under " Removal of Chassis ".
(2) Remove the IF Circuit Board from the Chassis.
(3) Remove the Screw and the Screw Post marked with ● shown in Fig. 1.
(4) Remove the AM Tuner Circuit Board from the Chassis gently taking care not to cut the leads.

Removal of AM Tuning Capacitor

(1) Remove the Chassis as outlined under " Removal of Chassis ".
(2) Set the Pointer to the upper end by turning the Tuning Knob. (near the 1,600 Kc)
(3) Remove the Dial Cord from the Pointer.
(4) Unscrew the two Screws marked with □ shown in Fig. 1 and remove the Dial Scale from the Chassis.
(5) Pull out the Tuning Gear for AM from the Tuning Capacitor and remove the two AM Tuning Capacitor Holding Screws.

To String the Dial Cord

String the Dial Cord in the order of figures, ①, ②, ③, ④ and ⑤, as shown in Fig. 2 while keeping the cut portion of the Tuning Drum faces toward the right upper.



(Fig. 2)

Adjustment of each Gear

(1) Rotate the tuning drum to the extreme clockwise position.
(2) Rotate the tuning drum 1-1/4 turns counter-clockwise from the position set in preceding step (1), so that the cut portion of the drum faces toward position marked with " A " shown in Fig. 2.
(3) Rotate the gear for the FM tuning capacitor to the extreme clockwise position.
(4) Rotate the gear for the AM tuning capacitor to the extreme counter-clockwise position.
(5) Adjust the position of each gear so that the gears may engage each other with perfect operation.

Frequency Coverage and Tracking Adjustment

MW Band

Preparation for Adjustments

☆ Receiver to be adjusted

Power Source Voltage :	Keep 4.5 Volts during the adjustments.
Volume Control setting :	Maximum
Tone Switch setting :	High
Band Switch setting :	MW
☆ Load for Output :	Connect an 8Ω resistor instead of speaker.
☆ Output Meter :	Connect across the load resistor 8Ω.
☆ Signal Source :	Use a SSG (Standard Signal Generator) which can deliver RF signals modulated at 30% with 1,000 c/s.
☆ Antenna :	Use a loop antenna.

Frequency Coverage Adjustment

(1) Deliver a 520 Kc signal from the SSG.

(2) Set the Tuning Capacitor at the maximum capacitance position by turning the Tuning Knob of the Receiver counter-clockwise.

(3) Adjust the core of the MW OSC Coil (L_{203}) to tune to the signal.

(4) Set the Tuning Capacitor at the minimum capacitance position by turning the Tuning Knob of the Receiver clockwise.

(5) Deliver a 1,680 Kc signal from the SSG.

(6) Adjust the MW OSC Trimmer Capacitor (CT_{202-2}) to tune to the signal.

(7) Repeat the above procedures (1～6) until the frequency range between 520 Kc and 1,680 Kc is ful'y covered.

Tracking Adjustment

(1) Deliver a 620 Kc signal from the SSG.

(2) Tune to the signal by turning the Tuning Knob of the Receiver.

(3) Adjust the position of the MW ANT Coil (L_{001}) along the Ferrite Bar to obtain the maximum output.

(4) Deliver a 1,400 Kc signal from the SSG.

(5) Tune to the signal by turning the Tuning Knob of the Receiver.

(6) Adjust the MW ANT Trimmer Capacitor (CT_{201-2}) to obtain the maximum output.

(7) Repeat the above procedures (1～6) until the maximum output is obtained.

SW Band

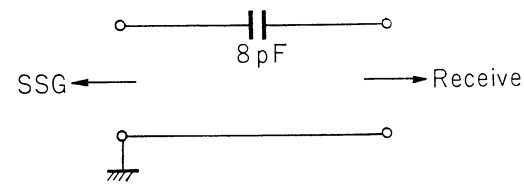
Preparation for Adjustments

☆ Receiver to be adjusted

Band Switch setting : SW

☆ Antenna : Use a Dummy Antenna.

Unsolder lead at telescopic antenna terminal and connect SSG to telescopic antenna lead and ground of receiver through Dummy Antenna as shown in Fig. 3.



(Fig. 3)

☆ Other preparations are same with that of MW adjustment.

Frequency Coverage Adjustment

(1) Deliver a 3.8 Mc signal from the SSG.

(2) Set the Tuning Capacitor at the maximum capacitance position by turning the Tuning Knob of the Receiver counter-clockwise.

(3) Adjust the core of the SW OSC Coil (L_{202}) to tune to the signal.

(4) Set the Tuning Capacitor at the minimum capacitance position by turning the Tuning Knob of the Receiver clockwise.

(5) Deliver a 12.6 Mc signal from the SSG.

(6) Adjust the SW OSC Trimmer Capacitor (CT_{202-1}) to tune to the signal.

(7) Repeat the above procedures (1～6) until the frequency range between 3.8 Mc and 12.6 Mc is fully covered.

Tracking Adjustment

(1) Deliver a 3.8 Mc signal from the SSG.

(2) Tune to the signal by turning the Tuning Knob of the Receiver.

(3) Adjust the core of the SW ANT Coil (L_{201}) to obtain the maximum output.

(4) Deliver a 12.6 Mc signal from the SSG.

(5) Tune to the signal by turning the Tuning Knob of the Receiver.

(6) Adjust the SW ANT Trimmer Capacitor (CT_{201-1}) to obtain the maximum output.

(7) Repeat the above procedures (1～6) until the maximum output is obtained.

FM Band

Preparation for Adjustments

☆ Receiver to be adjusted

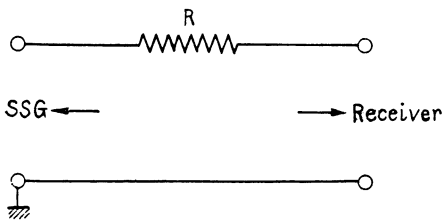
Power Source Voltage :	Keep 4.5 Volts during the adjustments.
Band Switch setting :	FM
Volume Control setting :	Maximum
Tone Switch setting :	HIGH
AFC Switch setting :	OFF

☆ Load for Output : Connect an 8Ω resistor instead of speaker.

☆ Output Meter : Connect across the load resistor 8Ω.
(VTVM can be used also.)

☆ Signal Source : Use a SSG (Standard Signal Generator) which can deliver RF signals modulated at 30% with 400 c/s.

☆ Dummy Antenna : Unsolder the lead at the telescopic antenna terminal. Connect the SSG to the telescopic antenna lead and ground of the receiver through the Dummy Antenna as shown in Fig. 4.



(Fig. 4)

* Nominal input impedance of the receiver is 75Ω.

* R is then calculated as follows :

$R = 75 - Rs\ [\Omega]$

where Rs is output impedance of the SSG which is usually 50Ω or 75Ω.

Frequency Coverage Adjustment

(1) Deliver a 85 Mc signal from the SSG.

(2) Set the Tuning Capacitor at the maximum capacitance position by turning the Tuning Knob of the Receiver counter-clockwise.

(3) Adjust the core and gap of the FM OSC Coil (L_{104}) to tune to the signal.

(4) Deliver a 109.5 Mc signal from the SSG.

(5) Set the Tuning Capacitor at the minimum capacitance position by turning the Tuning Knob of the Receiver clockwise.

(6) Adjust the FM OSC Trimmer Capacitor (CT_{102}) to tune to the signal.

(7) Repeat the above procedures (1～6) until the frequency range between 85 Mc and 109.5 Mc is fully covered.

Tracking Adjustment

(1) Deliver a 85 Mc signal from the SSG.

(2) Tune to the signal correctly by turning the Tuning Knob of the Receiver.

(3) Adjust the FM RF Coil (L_{102}) for the maximum reading on the Output Meter.

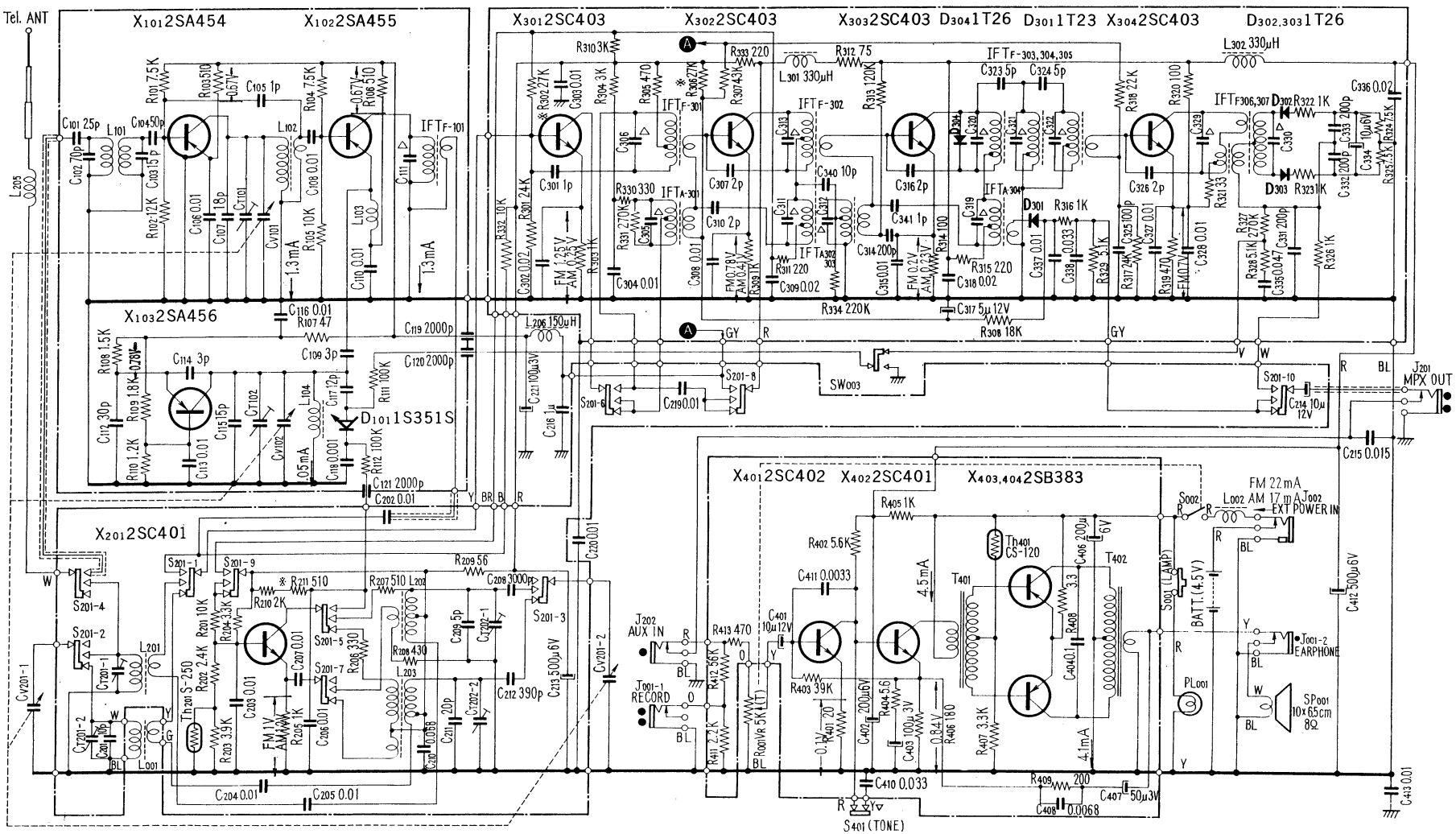
(4) Deliver a 109.5 Mc signal from the SSG.

(5) Tune to the signal correctly by turning the Tuning Knob of the Receiver.

(6) Adjust the FM RF Trimmer Capacitor (CT_{101}) to obtain the maximum output.

(7) Repeat the above procedures (1～6) until the maximum output is obtained.

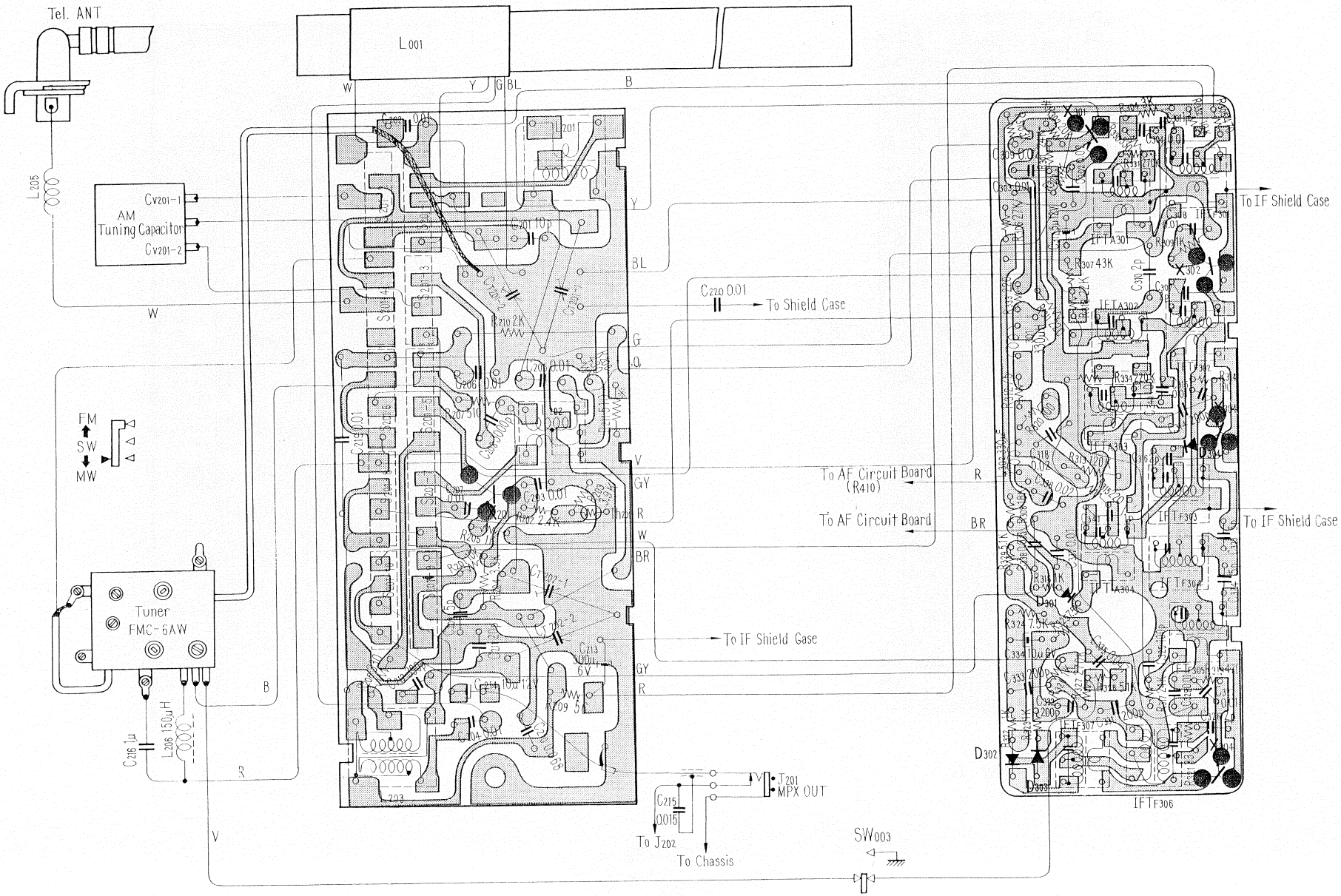
Schematic Diagram



Mounting Diagram

—Printed Side—

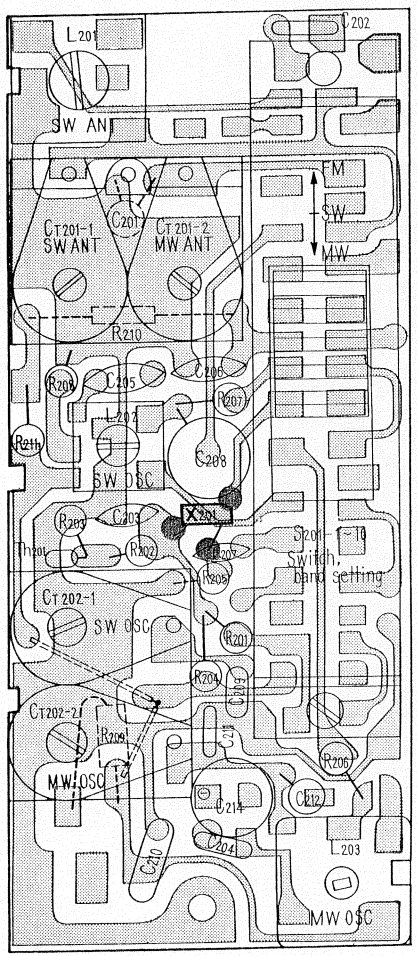
AM Tuner and IF Sections



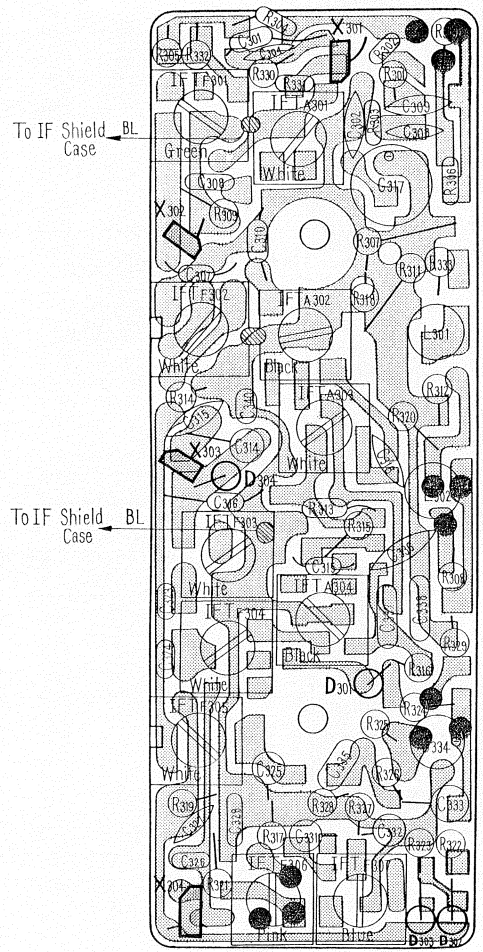
Mounting Diagram

—Parts Side—

AM Tuner Section



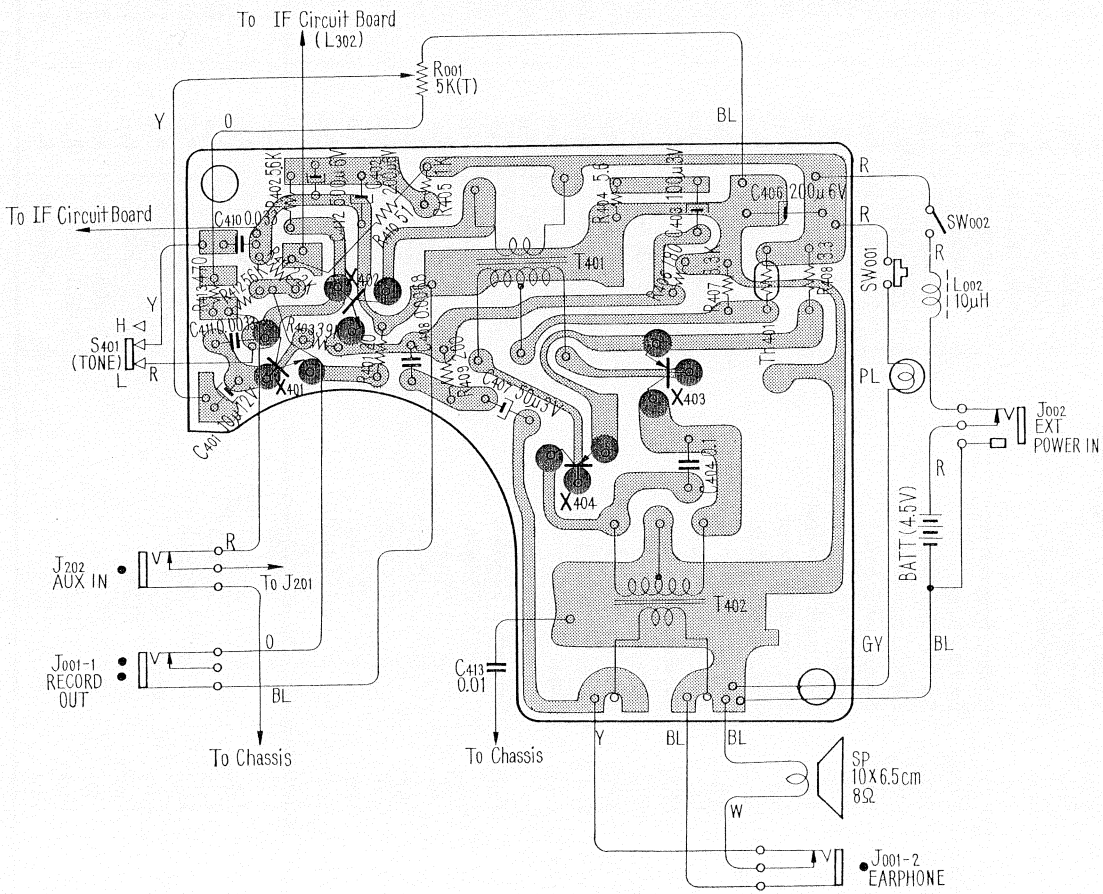
IF Section



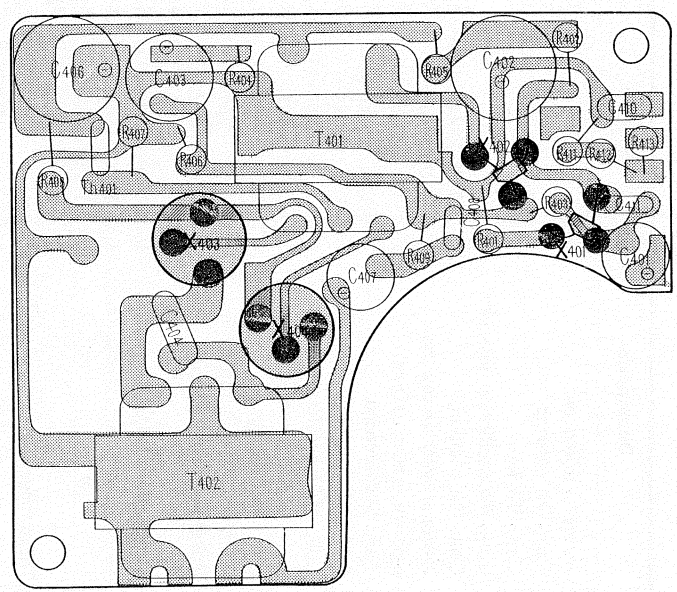
Mounting Diagram

AF Section

—Printed Side—



—Parts Side—



Electrical Parts List

Part No.	Symbol	Description
1-501-051-13	Tel. ANT	Antenna, telescopic
1-401-216-11	L_{101}	Coil, FM antenna
1-425-162-11	L_{102}	Coil, FM RF
1-405-282-11	L_{103}	Coil, FM oscillation injection
-135-11	L_{104}	Coil, FM oscillator
1-401-254-11	L_{001}	Antenna, MW ferrite bar
1-407-037-11	L_{002}	inductor, micro, 10μH
1-401-257-11	L_{201}	Coil, SW antenna
1-405-121-11	L_{202}	Coil, SW oscillator
-110-11	L_{203}	Coil, MW oscillator
	L_{204}	—deleted—
1-401-219-11	L_{205}	Coil, FM loading
1-407-030-11	L_{206}	Inductor, micro, 150μH
-050-11	L_{301}	Inductor, micro, 330μH
-050-11	L_{302}	〃 〃
1-403-231-15	$IFTF_{101}$	Transformer, FM single tuned
-243-15	$IFTF_{301}$	〃 〃
-244-15	$IFTF_{302}$	〃 〃
-244-15	$IFTF_{303}$	Transformer, FM triple tuned
-244-15	$IFTF_{304}$	
-244-15	$IFTF_{305}$	
-245-11	$IFTF_{306}$	Transformer, FM discriminator (Pri.)
-245-21	$IFTF_{307}$	(Sec.)
-026-11	$IFTA_{301}$	Transformer, AM single tuned
-110-15	$IFTA_{302}$	Transformer, AM double tuned
-026-11	$IFTA_{303}$	
-110-15	$IFTA_{304}$	Transformer, AM single tuned
1-423-072-11	T_{401}	Transformer, driver
1-427-122-11	T_{402}	Transformer, output
1-514-166-11	$SW_{201-1\sim10}$	Switch, band setting
-082-12	SW_{401}	Switch, tone
-114-11	SW_{001}	Switch, dial lamp
	SW_{002}	Switch, power on/off
1-514-082-12	SW_{003}	Switch, AFC on/off
1-536-030-00	TL_{001}	Terminal, 5P
1-507-011-01	J_{201}	Jack, multiplex output
-011-01	J_{202}	Jack, auxiliary input
-075-12	J_{001-1}	Jack, record output
	J_{001-2}	Jack, earphone
-100-11	J_{002}	Jack, external power input
1-502-118-11	SP_{001}	Speaker 6.5×10 cm
1-518-006-02	PL_{001}	Lamp, dial
1-528-002-00	Batt.	Batteries, 4.5V in total
3-851-002-01	S_{101}	Case, FM tuner shield
X-38173-03-4	S_{301}	Case, IF shield
	X_{101}	Transistor, 2SA454
	X_{102}	〃 2SA455
	X_{103}	〃 2SA456
	X_{201}	〃 2SC401
	X_{301}	〃 2SC403
	X_{302}	〃 2SC403
	X_{303}	〃 2SC403
	X_{304}	〃 2SC403
	X_{401}	〃 2SC402
	X_{402}	〃 2SC401
	X_{403}	〃 2SB383
	X_{404}	〃 2SB383
	D_{101}	Diode, 1S351S
	D_{301}	〃 1T23
	D_{302}	〃 1T26
	D_{303}	〃 1T26
	D_{304}	〃 1T26

Part No.	Symbol	Description
	Th_{201}	Thermistor S-250
	Th_{401}	〃 CS-120
		Resistor
1-221-447-13	R_{001}	5KΩ, volume control
1-208-054-11	R_{101}	7.5KΩ 1/10W ceramic
-059-11	R_{102}	12KΩ 〃 〃
-026-11	R_{103}	510Ω 〃 〃
-054-11	R_{104}	7.5KΩ 〃 〃
-057-11	R_{105}	10KΩ 〃 〃
-026-11	R_{106}	510Ω 〃 〃
-105-11	R_{107}	47Ω 〃 〃
-037-11	R_{108}	1.5KΩ 〃 〃
-039-11	R_{109}	1.8KΩ 〃 〃
-035-11	R_{110}	1.2KΩ 〃 〃
1-201-868-11	R_{111}	100KΩ 1/8W composition
1-208-145-11	R_{112}	100KΩ 1/10W ceramic
1-201-865-11	R_{201}	10KΩ 1/8W composition
1-240-482-11	R_{202}	2.4KΩ 〃 carbon
-487-11	R_{203}	3.9KΩ 〃 〃
-485-11	R_{204}	3.3KΩ 〃 〃
-473-11	R_{205}	1KΩ 〃 〃
1-201-870-11	R_{206}	330Ω 〃 composition
-270-11	R_{207}	510Ω 〃 〃
-616-11	R_{208}	430Ω 〃 〃
-265-11	R_{209}	56Ω 〃 〃
1-202-003-11	R_{210}	2KΩ 〃 〃
1-240-466-11	*R_{211}	510Ω 〃 carbon
1-202-249-11	R_{301}	24KΩ 〃 composition
1-208-066-11	*R_{302}	24KΩ 1/10W ceramic
-033-11	R_{303}	1KΩ 〃 〃
-044-11	R_{304}	3KΩ 〃 〃
1-201-453-11	R_{305}	470Ω 1/8W composition
1-208-068-11	*R_{306}	30KΩ 1/10W ceramic
1-202-076-11	R_{307}	43KΩ 1/8W composition
1-201-824-11	R_{308}	18KΩ 〃 〃
-862-11	R_{309}	1KΩ 〃 〃
-821-11	R_{310}	3KΩ 〃 〃
-858-11	R_{311}	220Ω 〃 〃
-973-11	R_{312}	75Ω 〃 〃
1-208-083-11	R_{313}	120KΩ 1/10W ceramic
1-201-679-11	R_{314}	100Ω 1/8W composition
-858-11	R_{315}	220Ω 〃 〃
-862-11	R_{316}	1KΩ 〃 〃
1-202-249-11	R_{317}	24KΩ 〃 〃
1-201-867-11	R_{318}	22KΩ 〃 〃
-453-11	R_{319}	470Ω 〃 〃
-679-11	R_{320}	100Ω 〃 〃
-960-11	R_{321}	33Ω 〃 〃
-862-11	R_{322}	1KΩ 〃 〃
-862-11	R_{323}	1KΩ 〃 〃
1-202-035-11	R_{324}	7.5KΩ 〃 〃
-035-11	R_{325}	7.5KΩ 〃 〃
1-201-862-11	R_{326}	1KΩ 〃 〃
-846-11	R_{327}	270KΩ 〃 〃
1-202-025-11	R_{328}	5.1KΩ 〃 〃
-025-11	R_{329}	5.1KΩ 〃 〃
1-201-870-11	R_{330}	330Ω 〃 〃
-846-11	R_{331}	270KΩ 〃 〃
-865-11	R_{332}	10KΩ 〃 〃
-858-11	R_{333}	220Ω 〃 〃
1-208-089-11	R_{334}	220KΩ 1/10W ceramic
1-201-951-11	R_{401}	20Ω 1/8W composition
-864-11	R_{402}	5.6KΩ 〃 〃

* To be adjusted

—continued—

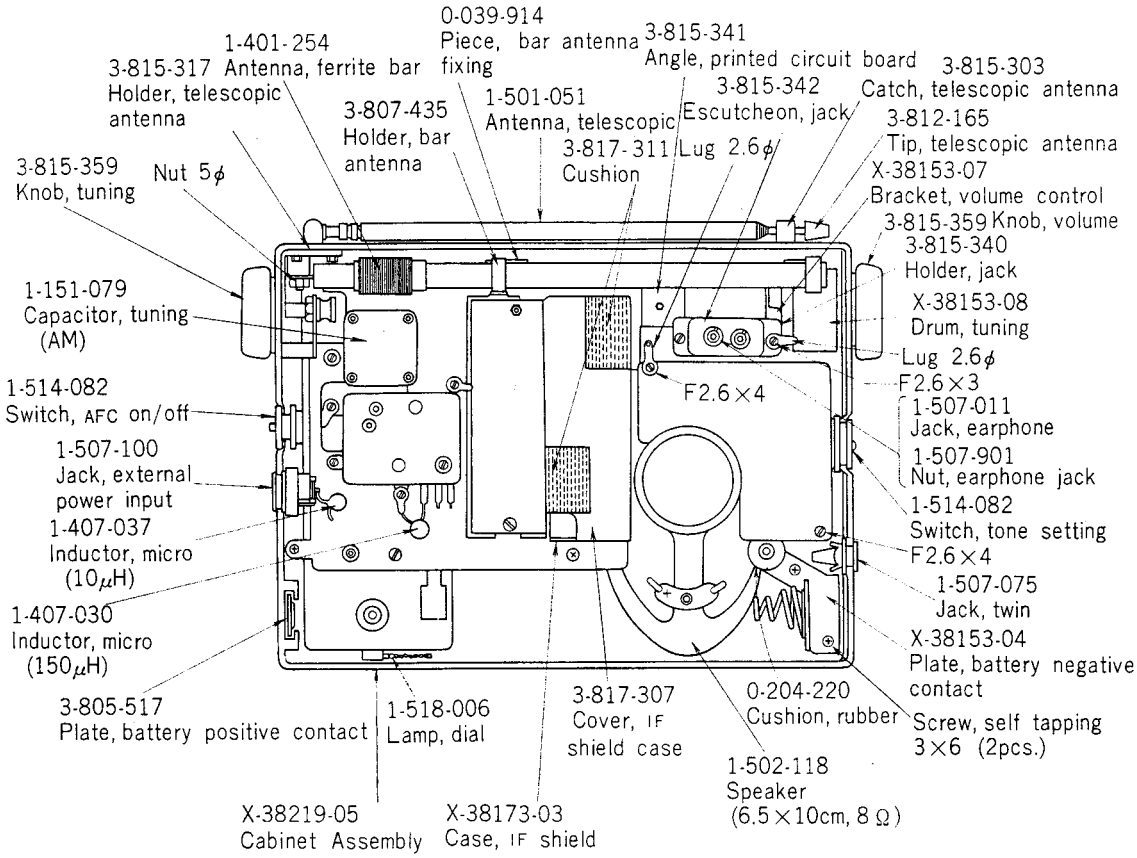
Part No.	Symbol	Description
1-201-695-11	R_{403}	39KΩ 1/8W composition
-894-11	R_{404}	5.6Ω // //
-862-11	R_{405}	1KΩ // //
-829-11	R_{406}	180Ω // //
-860-11	R_{407}	3.3KΩ // //
-874-11	R_{408}	3.3Ω // //
-990-11	R_{409}	200Ω // //
	R_{410}	—deleted—
1-201-863-11	R_{411}	2.2KΩ 1/8W composition
-086-11	R_{412}	56KΩ // //
-453-11	R_{413}	470Ω // //
		Capacitor
1-151-088-12	$CV_{101, 102}$ / $CT_{101, 102}$	tuning, 2 gang / trimmer, 2 unit
-079-11	$CV_{201-1\sim2}$	tuning, 2 gang
1-141-011-11	$CT_{201-1\sim2}$	trimmer, 2 unit
-011-11	$CT_{202-1\sim2}$	trimmer, 2 unit
1-101-090-11	C_{101}	25pF ceramic
-319-11	C_{102}	70pF //
-861-11	C_{103}	15pF //
-028-11	C_{104}	50pF //
-951-11	C_{105}	1pF //
-141-11	C_{106}	0.01μF //
-862-11	C_{107}	18pF //
-141-11	C_{108}	0.01μF //
-953-11	C_{109}	3pF //
-141-11	C_{110}	0.01μF //
	C_{111}	(Built in IFT_{F101})
1-101-871-11	C_{112}	30pF ceramic
-141-11	C_{113}	0.01μF //
-953-11	C_{114}	3pF //
-861-11	C_{115}	15pF //
-141-11	C_{116}	0.01μF //
-961-11	C_{117}	12pF //
1-105-821-12	C_{118}	0.001μF mylar
1-101-790-11	C_{119}	2000pF feed through
-790-11	C_{120}	2000pF //
-790-11	C_{121}	2000pF //
-959-11	C_{201}	10pF ceramic
1-105-411-12	C_{202}	0.01μF mylar
-411-12	C_{203}	0.01μF //
-411-12	C_{204}	0.01μF //
-411-12	C_{205}	0.01μF //
-411-12	C_{206}	0.01μF //
-411-12	C_{207}	0.01μF //
1-103-636-11	C_{208}	3000pF styrol
1-101-955-11	C_{209}	5pF ceramic
1-105-416-12	C_{210}	0.068μF mylar
1-101-864-11	C_{211}	20pF ceramic
1-103-615-11	C_{212}	390pF styrol
1-121-161-11	C_{213}	500μF 6V electrolytic
-282-11	C_{214}	10μF 12V //
1-105-412-12	C_{215}	0.015μF mylar
1-119-052-00	C_{216}	1μF electrolytic
	C_{217}	—deleted—
	C_{218}	—deleted—

Part No.	Symbol	Description
1-101-141-11	C_{219}	0.01μF ceramic
-141-11	C_{220}	0.01μF //
1-121-111-11	C_{221}	100μF 3V electrolytic
1-101-951-11	C_{301}	1pF ceramic
-142-11	C_{302}	0.02μF //
1-105-411-12	C_{303}	0.01μF mylar
-411-12	C_{304}	0.01μF //
	C_{305}	(Built in IFT_{A301})
	C_{306}	(Built in IFT_{F301})
1-101-952-11	C_{307}	2pF ceramic
1-105-411-12	C_{308}	0.01μF mylar
1-101-142-11	C_{309}	0.02μF ceramic
-952-11	C_{310}	2pF //
	C_{311}	(Built in IFT_{A302})
	C_{312}	(Built in IFT_{A303})
	C_{313}	(Built in IFT_{F302})
1-103-608-11	C_{314}	200pF styrol
1-105-411-12	C_{315}	0.01μF mylar
1-101-952-11	C_{316}	2pF ceramic
1-121-280-11	C_{317}	5μF 12V electrolytic
1-101-142-11	C_{318}	0.02μF ceramic
	C_{319}	(Built in IFT_{A304})
	C_{320}	(Built in IFT_{F303})
	C_{321}	(Built in IFT_{F304})
	C_{322}	(Built in IFT_{F305})
1-101-955-11	C_{323}	5pF ceramic
-955-11	C_{324}	5pF //
1-103-601-11	C_{325}	100pF styrol
1-101-952-11	C_{326}	2pF ceramic
1-105-411-12	C_{327}	0.01μF mylar
-411-12	C_{328}	0.01μF //
	C_{329}	(Built in IFT_{F306})
	C_{330}	(Built in IFT_{F307})
1-103-608-11	C_{331}	200pF styrol
-608-11	C_{332}	200pF //
-608-11	C_{333}	200pF //
1-121-282-11	C_{334}	10μF 12V electrolytic
1-127-047-11	C_{335}	0.047μF //
1-101-142-11	C_{336}	0.02μF ceramic
1-105-411-12	C_{337}	0.01μF mylar
-414-12	C_{338}	0.033μF //
	C_{339}	—deleted—
1-101-959-11	C_{340}	10pF ceramic
-951-11	C_{341}	1pF //
1-121-282-11	C_{401}	10μF 12V electrolytic
-291-11	C_{402}	100μF 6V //
-111-11	C_{403}	100μF 3V //
1-105-417-12	C_{404}	0.1μF mylar
	C_{405}	—deleted—
1-121-291-11	C_{406}	100μF 6V electrolytic
-287-11	C_{407}	50μF 3V //
1-105-831-12	C_{408}	0.0068μF mylar
	C_{409}	—deleted—
1-105-414-12	C_{410}	0.033μF mylar
-827-12	C_{411}	0.0033μF //
1-121-161-13	C_{412}	500μF 6V electrolytic
1-101-141-11	C_{413}	0.01μF ceramic

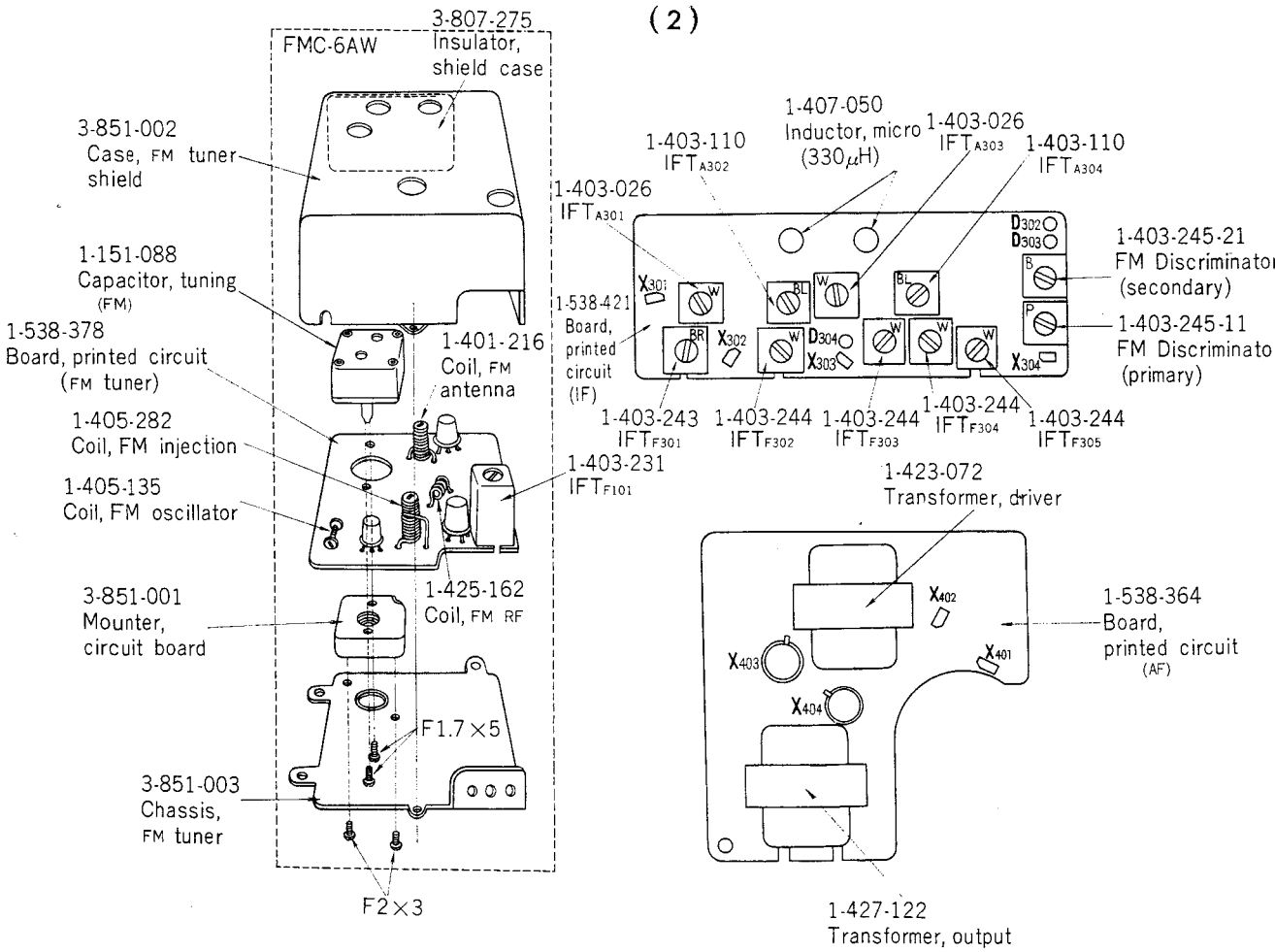
Instruction manual 3-995-371-

Exploded Diagram

(1)



(2)



Exploded Diagram

(3)